



THE HAWAII FOREST BIRD INTERAGENCY DATABASE PROJECT



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INTRODUCTION

In 1976-1983, the U.S. Fish and Wildlife Service (now USGS-Biological Resources Division) conducted systematic surveys of forest birds and plant communities as part of the Hawaii Forest Bird Surveys (HFBS) (Scott *et al.* 1986) (Fig. 1). Results of this effort have proven to be an important conservation tool during the past two decades, but population estimates and range maps are now out of date. We present a comprehensive inventory of all forest bird census data collected over the last 25 years in a centralized, standardized, relational database (Table 1).

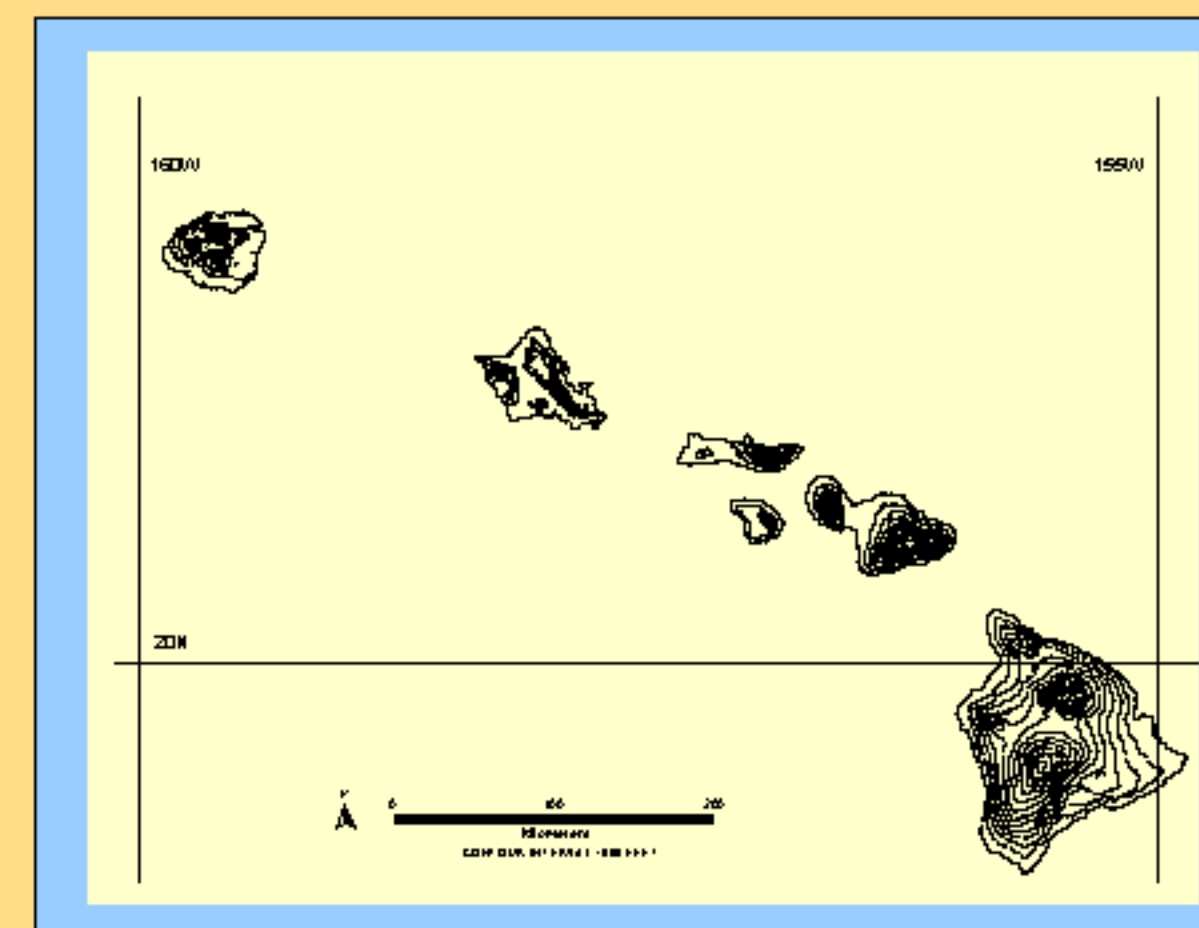


Fig. 1a. Hawaiian Islands covered by this project.

Table 1. Summary of forest bird count surveys by years for each region and island. HFBS survey years in yellow. Surveys conducted subsequent to the HFBS sampled only a portion of each region, except Mauna Kea, Hawaii and Alakai Plateau, Kauai.

ISLAND	REGION	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00
HAWAII	Kau																									
	Hamakua																									
	Kona																									
	Kohala																									
	Puna																									
	National Park and Kipukas																									
	Mauna Kea																									
MAUI	East																									
	West																									
LANAI																										
MOLOKAI																										
OAHU																										
KAUAI	Alakai Plateau																									

OBJECTIVES

- Create a centralized, standardized database of all forest bird survey data collected since and including the HFBS;
- Produce current population size estimates and GIS-based distribution maps for native and alien birds in Hawaii;
- Analyze trends in population size and range over the last two decades;
- Identify gaps in survey effort to guide future surveys;
- Where applicable, use the data to examine effects of management actions;
- Help guide design and interval of future survey regimes;
- Make data and results available via the Internet;
- Develop data entry protocols; and
- Provide a dynamic and up-to-date resource on populations of Hawaiian forest birds.

REFERENCES

- Buckland, S.T., D.R. Anderson, K.P. Burnham, and J.L. Laake. 1993. Distance sampling: Estimating abundance of biological populations. Chapman & Hall, New York.
- Fancy, S.G. 1997. A new approach for analyzing bird densities from variable circular-plot counts. Pacific Science 51:107-114.
- Scott, J.M., S. Mountainspring, F.L. Ramsey, and C.B. Kepler. 1986. Forest bird communities of the Hawaiian Islands: Their dynamics, ecology, and conservation. Studies in Avian Biology 9:1-431.
- Bird art: H. D. Pratt, Louisiana State University Museum of Zoology

METHODS

The database was created in MS ACCESS, and original survey data was contributed by cooperating agencies and individuals throughout Hawaii. Updated population estimates for native and alien Hawaiian forest birds will be produced using the most recent methodology (Buckland *et al.* 1993, Fancy 1997). Maps of transect locations and bird distributions are produced as GIS coverages using ARCINFO/ARCVIEW software.

PROJECT STATUS

As of August 2000, 151 surveys (82%) had been entered into the database. From 1976-2000, 13,575 stations on 425 transects have been sampled at least once. Seventy bird species have been recorded, including 31 native (26 forest species) and 39 alien birds. Of these, 44 species may be analyzed via the variable-circular plot method (21 native species), while 26 are best analyzed with other methods (10 native species).

All regions of the main Hawaiian Islands have been infrequently or partially sampled, except see Table 1. The Kohala region, Hawaii, and Lanai have never been resurveyed, whereas Kauai, Molokai, West Maui, and the Puna region, Hawaii have received limited resurvey efforts. The Hamakua region of the Big Island has received extensive survey effort, spanning all but 5 years in a 24-year period. However, only a small portion of the entire Hamakua region has been sampled subsequent to HFBS (Figs. 1b and 1c). Therefore, caution should be used in interpreting trends in bird populations.

CONTRIBUTORS

The following supporters have generously contributed data or financial support: National Park Service; USFWS-Refuges & Ecological Services; USGS-Biological Resources Division; Hawaii Department of Land and Natural Resources; Kamehameha Schools; The Nature Conservancy; and private contractors.

DATABASE APPLICATION

Spring survey efforts show that Iiwi (*Vestiaria coccinea*) distribution and abundance have decreased in the Hilo and Puna districts between the HFBS (late 1970s) and Subsequent Surveys (1986-2000) (Table 2) (Fig. 1c). Occurrences of Iiwi were infrequent below 1,300 m (4,200 ft) during both survey periods, although more so during the Subsequent Surveys. Efforts in the East Rift Zone and Puna – Geothermal area in 1992-1994 (Fig. 1c; lower right) yielded a 64% reduction in Iiwi frequency. Relative abundance decreased more than 35% between the two survey periods. However, neither reduction was significant at the 0.10 level due to extreme rarity of detections overall (n = 2 in Iiwi

Subsequent Surveys).

Table 2. Spring season frequency (%) and relative abundance (Birds Per Station [SE]) for Iiwi in Hilo and Puna districts, Hawaii. ¹ Stations above 1,300 m.

	East Rift and Puna		Hamakua & Nat. Park ¹	
	HFBS	Subsequent Surveys	HFBS	Subsequent Surveys
Frequency	1.52	0.97	30.2	16.4
Relative Abundance	0.017	0.006	1.26	0.79
	[0.010]	[0.004]	[0.25]	[0.25]

Changes in the frequency and relative abundance of Iiwi were similarly striking in the Hamakua and National Park regions (Fig. 1c; upper and left portions). Iiwi frequency decreased 54% since the HFBS surveys (Chi-square = 45.89, $P < 0.0001$). A decrease in relative abundance of more than 61% was observed over the same period. This application exemplifies quantitative information for an individual species; thus the database is a useful tool for resource managers.

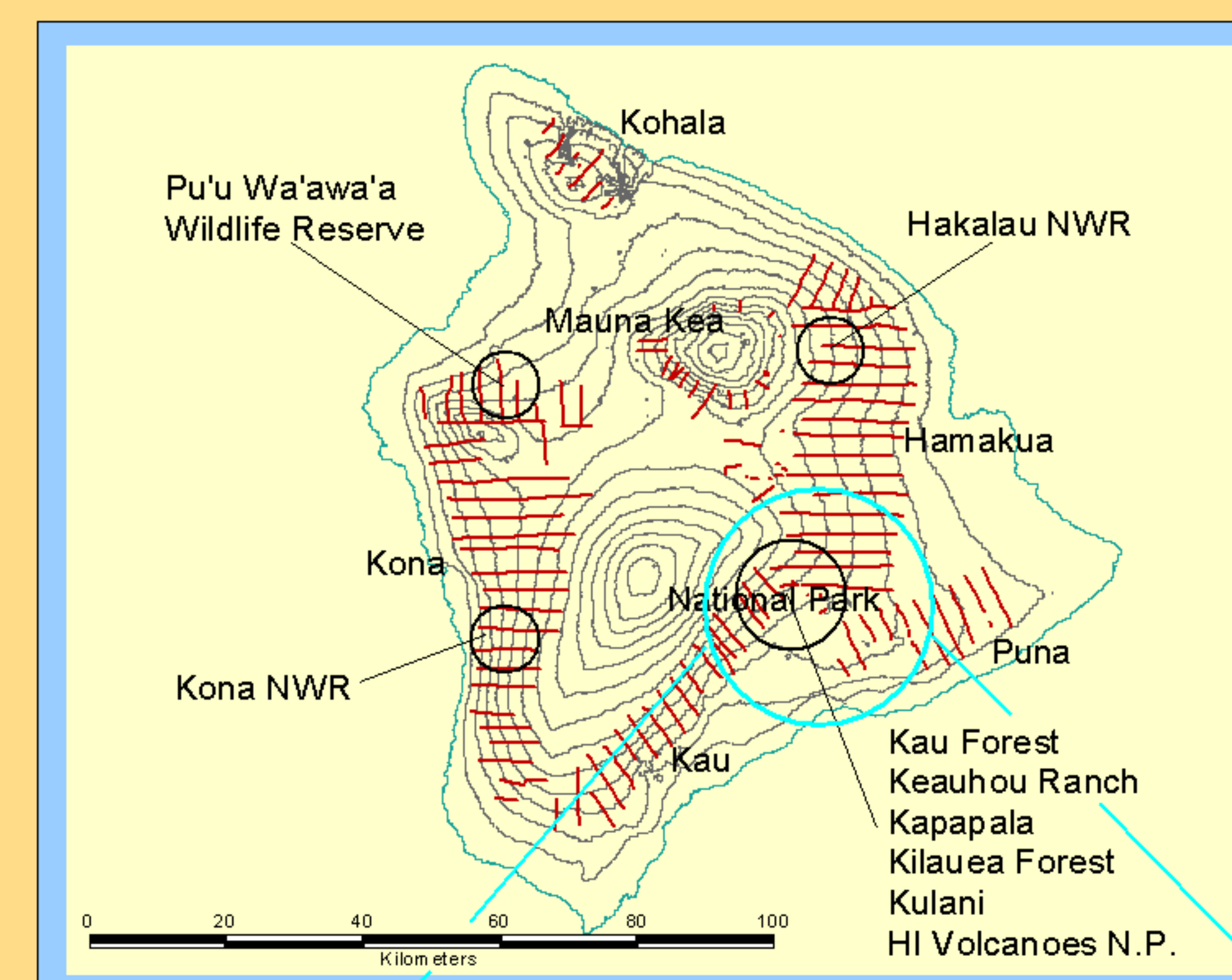


Fig. 1b. HFBS Transect locations on the island of Hawaii.

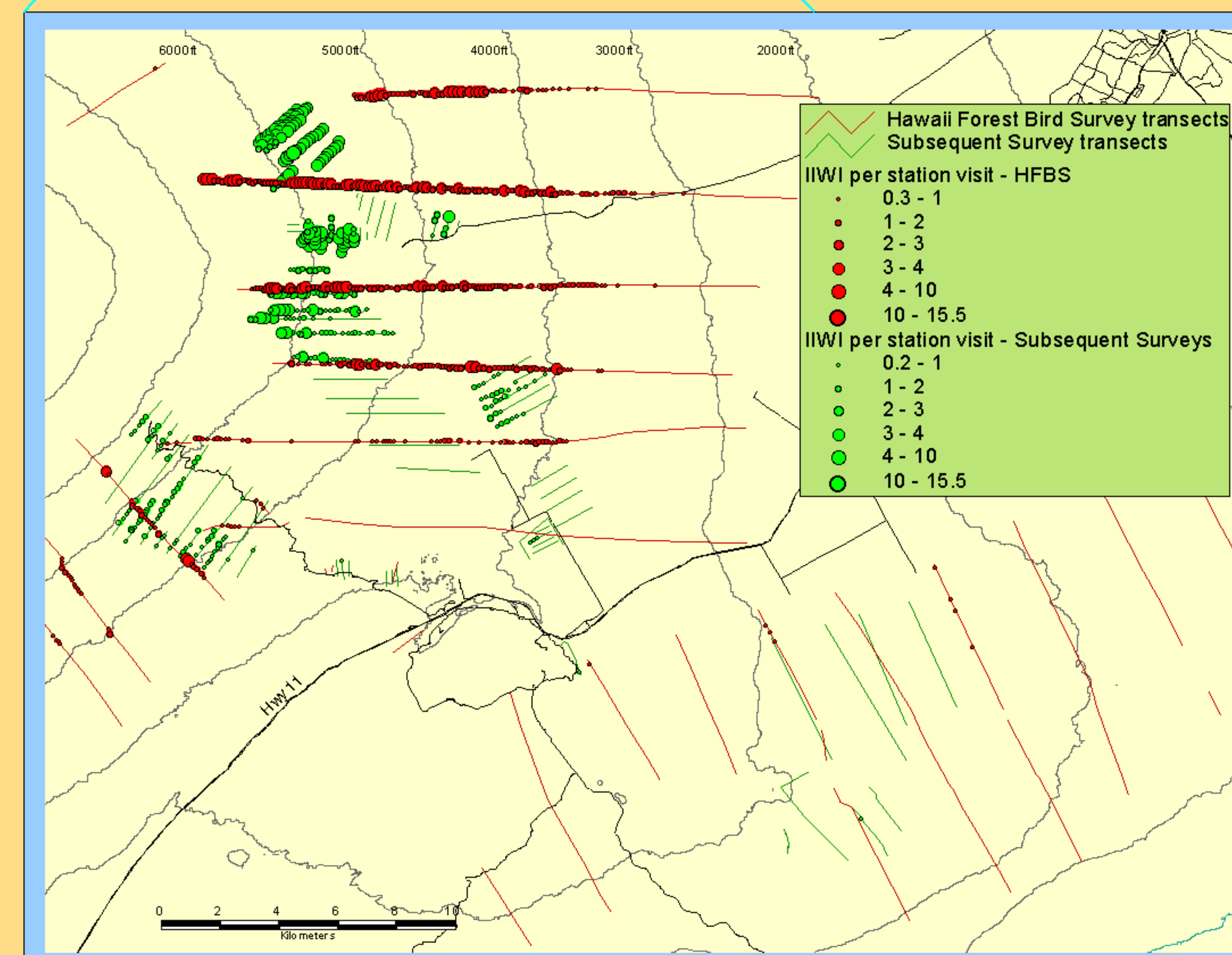


Fig. 1c. Example of the Database application. Iiwi distribution in the Hamakua, Kau and Puna regions of the island of Hawaii.